UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EIICHI NISHIMURA

Appeal 2007-3323
Application 09/963,499[1]
Technology Center 2600

Decided: April 29, 2008

Before RICHARD TORCZON, SALLY C. MEDLEY and JAMES T. MOORE, *Administrative Patent Judges*.

MEDLEY, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1] Application for patent filed 27 Sept. 2001. The real party in interest is Oki Electric Industry Company, Ltd.

A. Statement of the Case

This is an appeal under 35 U.S.C. § 134 from the Examiner's Final Rejection of claims 9-15[2]. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Horna	4,600,815	Jul. 15, 1986
Lane	6,381,244	Apr. 30, 2002
Li	6,580,795	Jun. 17, 2003

Claims 9-12 stand rejected as being unpatentable under 35 U.S.C. § 103(a) over Horna and Lane.

Claims 13-15 stand rejected as being unpatentable under 35 U.S.C. § 103(a) over Horna, Lane and Li.

BACKGROUND

The invention is related to an echo canceler **31** that removes the echo of a receive signal from a transmit signal and controls the signal level of the transmit signal.

Referring to figure 1, reproduced below, a transmit input signal TXi from a microphone **4** and a receive input signal RXi from a communication link are supplied to an echo cancellation signal generator **14** and a signal level data generator **24**. The echo cancellation signal generator **14** generates an echo cancellation signal EC while the signal level data generator **24** compares the input signals TXi and RXi to respective minimum input levels and generates signal level data LD for the transmit input signal TXi.

[2] Claims 1-8 were cancelled by Amendment in the Response filed 21 Jan. 2005.

The echo cancellation signal EC is supplied to a first AGC (automatic gain control) unit **12** and the transmit input signal TXi is supplied to a second AGC unit **23**. The echo cancellation signal EC and transmit input signal TXi are amplified or attenuated by multiplication at the respective AGCs by a gain factor determined from the signal level data LD. A subtractor **13** subtracts the amplified or attenuated echo cancellation signal ECm from the amplified or attenuated transmit input signal TXm and generates a transmit output signal TXo.

The echo canceler **31** also compares the transmit input signal TXi and the receive input signal RXi to minimum input levels TXi (min) RXi (min) and updates the signal level data LD when TXi is greater than TXi (min) and RXi is less than RXi (min) and updates the coefficients of the echo cancellation signal generator when TXi is less than TXi (min) and RXi is greater than RXi (min) (Abstract, Spec. pp. 6-11, **fig. 1**). Figure 1 from the Application is reproduced below.

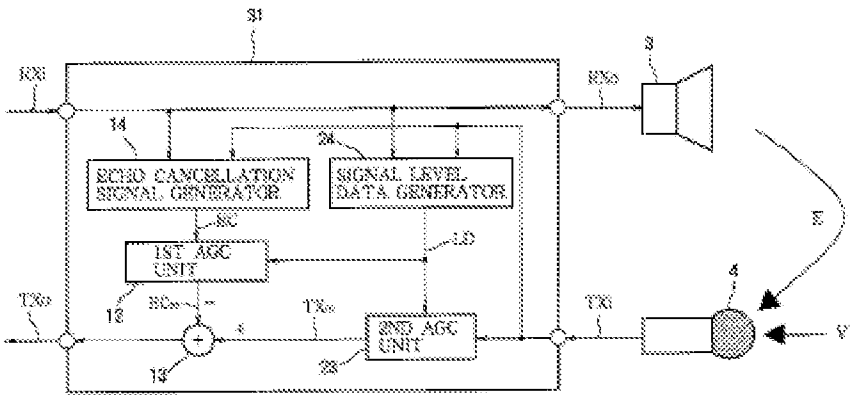

Figure 1 depicts a microphone and a speaker with circuitry for removing the echo of the speaker signal from the microphone signal and controlling the signal level of the microphone signal.

B. Issues

The first issue before us is whether Applicant has shown that the Examiner erred in determining that claims 9-12 are unpatentable under 35 U.S.C. § 103(a) over Horna and Lane?

The second issue before us is whether Applicant has shown that the Examiner erred in determining that claims 13-15 are unpatentable under 35 U.S.C. § 103(a) over Horna, Lane and Li?

For the reasons that follow, Applicant has shown that the Examiner erred in determining claims 9-12 as unpatentable under 35 U.S.C. § 103(a) over Horna and Lane and claims 13-15 as unpatentable under 35 U.S.C. § 103(a) over Horna, Lane and Li.

C. Findings of Fact ("FF")

The record supports the following finding of facts as well as any other findings of fact set forth in this opinion by at least a preponderance of the evidence.

1.Applicant's claims 9-15 are the subject of this appeal.

2.Claims 9, 13 and 14 are independent.

3.Claims 10-12 are dependent on claim 9 and claim 15 is dependent on claim 14.

4.Claims 9-13 stand or fall together (App. Br. 16).

5.Claims 14-15 stand or fall together (App. Br. 16).

6.Claims 13 and 14 are representative and are as follows:

> 13. An echo canceler receiving a transmit signal and a receive signal, the transmit signal including an echo of the receive signal, comprising:
>
> an echo cancellation signal generator updating filter coefficients when the transmit signal is less than a first

minimum input level and the receive signal exceeds a second minimum input level;

a signal level data generator updating signal level data when the transmit signal exceeds the first minimum input level and the receive signal is less than the second minimum input level;

a first automatic gain control unit updating a first gain when the signal level data generator updates the signal level data; and

a second automatic gain control unit updating a second gain when the signal level data generator updates the signal level data.

14 An echo canceler receiving a transmit signal and a receive signal, the transmit signal including an echo of the receive signal, comprising:

an echo cancellation signal generator generating an echo cancellation signal from the receive signal by use of filter coefficients, and updating the filter coefficients when the transmit signal is less than a first minimum input level and the receive signal exceeds a second minimum input level;

a signal level data generator generating signal level data for the transmit signal and updating the signal level data when the transmit signal exceeds the first minimum input level and the receive signal is less than the second minimum input level, the signal level data being left unchanged when the receive signal exceeds the second minimum level;

a first automatic gain control unit coupled to the echo cancellation signal generator, amplifying the echo cancellation signal with a first gain responsive to the signal level data, and updating the first gain when the signal level data generator updates the signal level data, thereby generating an amplified echo cancellation signal;

a second automatic gain control unit coupled to the signal level data generator, amplifying the transmit signal with a second gain responsive to the signal level data, and updating the second gain when the signal level data generator updates the signal level data, thereby generating an amplified transmit signal; and

an arithmetic unit coupled to the first automatic gain control unit and the second automatic gain control unit, subtracting the amplified echo cancellation signal from the amplified transmit signal, thereby generating a transmit output signal for output from the echo canceler.

7.The Examiner found that Horna describes an echo canceller filter that is sensitive to double-talk situations and disables its adaptation in the presence of double-talk, while allowing adaptation in the presence of far-end speech only and meets the limitation of updating the coefficient when the transmit signal is inactive and the receive signal is active (Final Rejection 3 and Ans. 5, Horna col. 2, ll. 33-63).

8.The Examiner found that Horna describes controlling echo canceller filter coefficient updating based on the presence of double talk (Final Rejection 4-5 and Ans. 6).

9.The Examiner found that Horna describes two matched attenuators with a common control that equally amplify the send signal and the echo replica signal before combining them at the summer (Final Rejection 2 and Ans. 4).

10.The Examiner found that Horna does not describe updating the amount of attenuation provided by the attenuators, but that they only attenuate signals of abnormally high amplitude (Final Rejection 2 and Ans. 4).

11.The Examiner found that Lane describes talk sensitive AGC devices which update their gain in response to the signal level data G (Final Rejection 4 and Ans. 4).

12.The Examiner found that Lane describes that gain G is updated according to typical AGC methods during TALK mode (Final Rejection 3, Ans. 4 and 11, Lane col. 5, ll. 21-31).

13.The Examiner also found that detecting the speech state of both near and far end signals before applying a type of gain control enables the system to maintain the dynamic range of the input signal in various circumstances that require different optimal approaches (Final Rejection 3 and Ans. 4).

14.The Examiner concluded that it would have been obvious to replace the automatic gain control (AGC) method and attenuators **32** and **33** of Horna with the speech state dependent AGC method and AGC control devices **53** and **54**, which update their gain in response to signal level data G of Lane, to control the dynamic range based on the various optimal operating methods required by the different speech states (Final Rejection 3-4 and Ans. 5-6).

15.Applicant argues that Lane does not describe a signal level data generator that updates signal level data when the transmit signal exceeds a first minimum input level and the receive signal is less than the second minimum input level (App. Br. 15).

16.The Examiner argues that the invisible means for calculating G in Lane corresponds to the claimed signal level generator and G is supplied to both AGC units **53** and **63** (Ans. 11-12).

17.Lane describes that the "speakerphone system 50 calculates gain G using conventional AGC techniques." (col. 5, ll. 21-22).

D. Principles of Law

"Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007).

"[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant." *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

E. Analysis

Claims 9-13

Claims 9-13 stand or fall together (FF[3] 4). Claims 9 and 13 are independent (FF 2). We focus our analysis on Claim 13 which recites the limitation "a signal level data generator updating signal level data when the transmit signal exceeds the first minimum input level and the receive signal is less than the second minimum input level".[4]

The Examiner relies on Lane to teach the signal level generator and first and second AGC (Automatic Gain Control) units **53** and **54** (Final Rejection 2-6 and Ans. 3-7). The Examiner found that Lane describes talk-mode sensitive AGC devices which update their gain in response to the signal level data G (FF 11). The Examiner further found that during a TALK mode gain G is updated according to typical AGC methods (FF 12).

Applicant argues that Lane does not describe a signal level data generator that updates signal level data when the transmit signal exceeds a first minimum input level and the receive signal is less than the second minimum input level (FF 15). In response, the Examiner argues that Lane describes that the gain G is calculated using conventional AGC techniques and that this invisible means for calculating G corresponds to the claimed signal level data generator with G being supplied to both AGC units **53** and **63** (FF 16).

We understand the Examiner to find Lane's G to correspond to both the signal level data and the gain (FFs 11-12). Although the Examiner argues that there is an invisible means for calculating the signal level data (G), the

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[3] FF denotes Finding of Fact.

[4] Claim 9 similarly recites "generating signal level data for the transmit signal; updating the signal level data when the transmit signal is active and the receive signal is inactive".

Examiner fails to direct us to a description in Lane that describes "the signal level data generator updating the signal level data when the transmit signal exceeds a first minimum input level and the receive signal is less than the second minimum input level" as recited in claim 13. We agree with the Examiner that Lane describes that the "speakerphone system 50 calculates gain G using conventional AGC techniques." (FF 17). However, the Examiner does not explain how conventional AGC techniques meet the limitation of "updating signal level data when the transmit signal exceeds the first minimum input level and the receive signal is less than the second minimum input level". The Examiner has failed to explain or direct us to evidence as to what "conventional AGC techniques" means or how the conventional technique meets the very specific limitation of how the signal level data is updated. For this reason, the Examiner has failed to meet its burden of presenting a prima facie case of unpatentability as required.

Applicant has sufficiently shown that the Examiner erred in determining claim 13 as unpatentable under 35 U.S.C. § 103(a) over Horna, Lane and Li. Since claims 9-12 stand or fall together with claim 13 (FF 4), Applicant has also sufficiently shown that the Examiner erred in determining claims 9-12 as unpatentable under 35 U.S.C. § 103(a) over Horna and Lane.

Claims 14-15

Claims 14-15 stand or fall together (FF 5). Claim 14 is independent (FF 2) and includes all of the limitations of claim 13 (FF 6). For the same reasons as explained above with respect to claim 13, Applicant has sufficiently shown that the Examiner erred in determining claims 14-15 as unpatentable under 35 U.S.C. § 103(a) over Horna, Lane and Li.

Decision

Upon consideration of the record, and for the reasons given, the Examiner's rejections of claims 9-12 as unpatentable under 35 U.S.C. § 103(a) over Horna and Lane and claims 13-15 as unpatentable under 35 U.S.C. § 103(a) over Horna, Lane and Li are reversed.

REVERSED

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